

Module 1



Indoor Air Quality Tools for Schools



Key Messages of Today's Session

- ◆ **Indoor Air Quality (IAQ) is Important**
- ◆ **IAQ is an Important Issue for Schools**
- ◆ **You Can Do Something to Improve IAQ**
- ◆ **Action is Needed Now**





“In the construction of buildings, whether for public purposes or as dwellings, care should be taken to provide good ventilation and plenty of sunlight. ...schoolrooms are often faulty in this respect. Neglect of proper ventilation is responsible for much of the drowsiness and dullness that ...make the teacher’s work toilsome and ineffective.”

Health Reformer, 1871



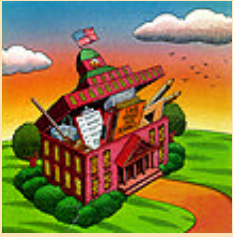
Agenda

- ◆ What is IAQ?
- ◆ Importance of IAQ in Schools
- ◆ Unique Aspects of Schools
- ◆ Causes and Effects of Poor IAQ
- ◆ Identifying IAQ Problems
- ◆ Overview of *IAQ Tools for Schools Kit*
- ◆ What You Can Do



Objectives

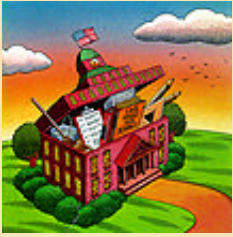
- ◆ You will be able to:
 - ◆ Describe the Effects of Poor IAQ in Schools
 - ◆ Identify Potential IAQ Needs in your School
 - ◆ Describe How an IAQ Program Works
 - ◆ List Benefits of an IAQ Program
 - ◆ Assess the Feasibility of Adopting an IAQ Program
 - ◆ Develop an Action Plan



What is Indoor Air Quality?

in-door (in'dôr') *adj.* **air** (er,ar) *n.* **quality** (kwô'i'tē) *n.*

1. the temperature, humidity, ventilation, and chemical or biological contaminants of the air inside a building.



Americans spend about 90% of their day indoors- in classrooms, in offices, at home. Pollution indoors is two to five times- and occasionally more than 100 times- higher than outdoor levels.

When compared to other threats to human health, EPA, its Science Advisory Board and others consistently rank indoor air pollution among the top four environmental risks facing the American people.



Potential Causes of Poor Air Quality

- ◆ Reduced Ventilation
- ◆ Building Materials and Furnishings
- ◆ Deferred Maintenance to Save Money
- ◆ Pesticides, Housekeeping Supplies, School Supplies, and Chemicals in Personal Care Products





Major Causes of Poor IAQ

- ◆ Pollution Sources
- ◆ Improperly Operated and Maintained Ventilation Systems
- ◆ Building Occupants and their Activities





Indoor Air Pollutant Sources

- ◆ **Building Materials and Furnishings**
- ◆ **Maintenance Products**
- ◆ **Office Equipment**
- ◆ **Microbiological Contamination**
- ◆ **Outdoor Air Pollution**
- ◆ **Soil Gases (e.g., Radon)**
- ◆ **Occupants**





Common HVAC System Problems

- ◆ **Insufficient Outdoor Air Supply**
- ◆ **Controls Broken or Disconnected**
- ◆ **Dirty Filters**
- ◆ **Microbiological Growth in Drip Pans, Ductwork, Coils, and Humidifiers**
- ◆ **Improper Operation and/or Maintenance**





Ways Occupants Contribute to Poor IAQ

- ◆ **Bacteria and Viruses**
- ◆ **Improper Use of Products and Equipment**
- ◆ **Disabling or Blocking Ventilation Systems**
- ◆ **Personal Care Products**
- ◆ **Pets in Classrooms**
- ◆ **Tobacco Smoke**

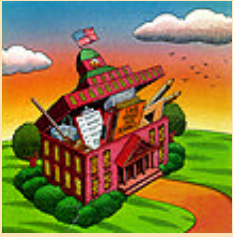




Consequences of Poor IAQ

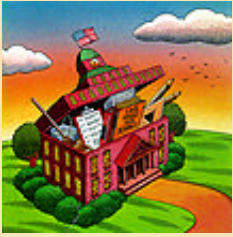
- ◆ Health Problems
- ◆ Reduced Learning and Productivity
- ◆ Higher Costs to Fix Problems than to Prevent
- ◆ Poor Public Relations
- ◆ Liability Issues





Possible Negative Health Effects

- ◆ **Increased Spread of Infectious Diseases**
- ◆ **Coughing, Bronchitis**
- ◆ **Asthma Episodes**
- ◆ **Headaches**
- ◆ **Allergic Reactions**
- ◆ **Carbon Monoxide Poisoning**
- ◆ **Legionnaires' Disease**



Human Costs of Poor IAQ

- ◆ **Decreased Ability of Children to Learn**
- ◆ **Decreased Effectiveness of Teachers and Staff**
- ◆ **Increased Absenteeism for Students, Teachers and Staff**





Economic Costs of Poor IAQ

- ◆ **Pay for Substitute Teachers and Staff**
- ◆ **Lower Operating Efficiency of Equipment and Plant**
- ◆ **Emergency Equipment**
- ◆ **Consultants During an “IAQ Event”**
- ◆ **Absent Students Reduce Funding**
- ◆ **Liability**
- ◆ **Closing Schools and Relocating Students**





Additional Potential Costs

- ◆ Negative Media Coverage
- ◆ Angry or Frightened Parents, Staff, and Public
- ◆ Increased Risk of Legal Action by Unions or Parents
- ◆ Accountability to School Board and Other Officials

Teachers at Arlington School Link Ailments to Renovations

Poor Ventilation May Be Contributing to Problems, Officials Say

By Stephanie Griffith
Hampshire Post Staff Writer

More than two dozen teachers at Arlington's Kenmore Middle School are blaming renovations that began 18 months ago at the 1960s-vintage school for a variety of physical problems they have suffered, including fatigue, rashes and miscarriages.

At a meeting Friday with county school officials, the teachers said a half-dozen of their colleagues at the school had suffered miscarriages since the start of the construction project, which has replaced ceiling windows and flooring in many rooms.

"I have been totally miserable this year," said Barbara Mage, 28, who has lost a child from hair loss, eye, nose and throat problems.

Idea, are getting sick, parents say. Administrators share the frustration. For several irritants, federal standards do not exist.

By John Brown
Hampshire Post Staff Writer

Kenmore Middle School in Arlington is not the only school in the state where teachers and parents are blaming school renovations for health problems. In fact, a survey of school districts across the state found that more than 100 schools have reported similar problems.

miscarriages among school staff members since work began, but he doubted ventilation problems have caused them.

The renovations at Kenmore are part of a six-year, \$72 million project that will touch nearly every school before 2000.

School officials say that ventilation might be a problem, but some teachers say they have tested the air and found it to be satisfactory.

that new testing for airborne chemicals is undertaken. School officials would review those results.

Person who comes to work is able to work in conditions that are satisfactory," Cohen said.

Some teachers say they have tested the air and found it to be satisfactory. Others say they have not. Some say they have tested the air and found it to be satisfactory. Others say they have not.

Mouse dies from air in classroom

Duxbury school tested

By Sam Kain
The Patriot Ledger

DUXBURY — A laboratory mouse died and others were paralyzed after breathing a sample of air from a fifth-grade classroom at the Chandler Elementary School, school officials were told last night.

Complaints pour in about bad school air

"There has not been one case of the state being so bad," said a state health official.

The state health official said that the state has not had a case of the state being so bad for a long time.



'witches' brew' of toxins



Teachers at Arlington School Link Ailments to Renovations

Poor Ventilation May Be Contributing to Problems, Officials Say

By Stephanie Griffith
Washington Post Staff Writer

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School officials said poor venti-

that new testing for airborne chemicals be undertaken. School officials said they would review those requests.

"A person who comes to work ought to be able to work in conditions that are satisfactory," Cohen said.

School Board members said they have not yet seen the report of the



Not Ledger

March 17, 1993

City Edition

ue, she says

ly a total \$5,000 in real estate taxes
1992 and 1993 and water and sewer
ges from 1991 and 1992 on their
leberry Lane home.

plebaum called a press conference
rday to explain why she and her
and have not paid real estate taxes in
years. She accused FitzGibbons of
tical blackmail" for threatening to
public that she is a tax delinquent

Please see TAXES — Page 14

Mouse dies from air in classroom

Duxbury school tested



**TRADING
CARDS: HOT
NEW FAD**

SPORTS



ODU: ON TO ROUND 2
TAR-HEELS: ECU HUNG ON FOR A HALF
STUNNER: 2ND SEED ARIZONA OUSTED

PREVIEW

**TENDER BUT
TOUGH: REBA
MCENTIRE**

THE LEDGER-STAR

19, 1993

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HAMPTON ROADS' ONLY AFTERNOON NEWSPAPER

118th Year, No. 6

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■ HEADLINES ■

Court's Justice White readily ready to retire

Justice Byron R. White was expected to announce his retirement today, giving President Clinton an early opportunity to name his first appointment to the nation's highest court, The Associated Press has learned. The effective date of White's resignation is not known; the current term of the court ends in late June or early July. White's office refused to comment. White has served on the bench for 31 years.

Experts say Woody Allen not abuse adopted child



After hearing a long-awaited report that concluded he did not sexually abuse his adopted daughter, Woody Allen emerged

Classroom air may hurt learning

More polluted than outdoors

By Lawrence L. Knutson
Associated Press

WASHINGTON — Attention teachers: The air in your classroom may be far more polluted than it is outside, posing a hazard both to health and the ability to learn.

The Environmental Protection Agency says levels of school air pollutants may be two to five times — and occasionally 10

times — higher than outdoor levels.

In a report to a House Commerce subcommittee on health, the EPA said Thursday a survey of hundreds of schools across the country showed high levels of carbon dioxide, unacceptable levels of the radioactive gas radon, and frequent occurrences of mold, fungi, mildew and volatile organic chemicals in classroom air.

Margo T. Oge, director of the EPA's Office of Radiation and Indoor Air, said preliminary investigations show "there is cause for concern about the indoor air quality of our schools."

"This situation may compromise our children's health and their ability to learn," she said.

She said indoor air pollution has increased over the past several decades, in part, because of the construction of more tightly sealed buildings, the use of synthetic building materials, and the increased use of chemicals.

Pollution is compounded in schools by the chemicals and toxic materials used in science labs, art rooms and vocational training work spaces, she said.

She said indoor air pollution can cause serious long-term health risks such as lung disease and cancer, and such short-term problems as asthma.

She said indoor pollution can bring on such symptoms as dry or burning eyes, noses and throats, sneezing, stuffy or runny noses, fatigue, lethargy and forgetfulness.

WHAT TO DO?

Schools can take steps to improve the quality of their indoor air, an EPA expert says:

■ Remove potential sources of contaminants such as moldy carpets.

■ Check heating, ventilation and air conditioning systems to ensure adequate ventilation.

BEHIND THE FRONT LINES: INSIDE AN ANTI-ABORTION BOOT CAMP



Big cities aren't the



Complaints pour in about bad school air

BOSTON (AP) — The air inside Massachusetts school buildings can be a major threat to the health of children because of pollutants such as radon and asbestos, researchers say.

The Massachusetts Department of Public Health's Bureau of Environmental Health Assessment has investigated 33 school air-quality complaints in the last 11 months. Department officials said air-quality investigations have been requested in 43 other districts.

"There has not been one area of the state that we have not been to," bureau director Suzanne Condon said.

"We are seeing a big increase in the number of calls we've received about air quality in schools — particularly about elementary schools," Condon said.

U.S. Environmental Protection Agency studies of air quality in schools estimate that one in five American schools may have unsafe levels of radon, one in three pose asbestos risks and thousands more may contain other pollutants — including exhaust fumes, biological agents such as mold

▼
'There has not been one area of the state that we have not been to'

Suzanne Condon
State health official
▲

and chemical contaminants.

Doctors say the risks from exposure to the bad air range from minor problems interfering with learning, such as hyperactivity and fatigue, to life-threatening diseases, such as cancer and asthma.

This past year, classrooms in a Carver elementary school were permanently closed due to air quality problems. Dracut had to replace the entire roof at a school with an unusual incidence of viruses and West Bridgewater closed down a school building plagued by intractable air-quality problems.

Regional EPA officials said last

week that Massachusetts residents have placed the second-highest number of calls to the agency's Indoor Air Quality Clearinghouse hot line for complaints about school air quality problems rapidly increasing.

EPA studies indicate school populations may be particularly susceptible to indoor air-pollution risks because children are more vulnerable to lower levels of contaminant exposure than adults; schools use heating, ventilating and air conditioning systems that require careful inspection and maintenance to ensure air quality; and the variety of chemicals used in cleaning products, building materials, carpets and furnishings has increased.

The Indoor Air Quality Act, introduced in April by U.S. Rep. Joseph P. Kennedy 2nd, would provide \$47 million a year to research, publicize and combat indoor air pollution. Backed by the Clinton administration, the bill also calls for a first-ever national program to assess air quality at schools, day-care centers and federal buildings.



Phils score another sweep

Quantrill goes 7½ innings as Astros fall in Houston. **Sports Extra.**

Honoring Montco police

New Norristown site remembers 22 who died. **Neighbors.**

**Northern
Suburbs
Edition**

The Philadelphia Inquirer

Monday, May 15, 1995

50 cents outside the eight-county Philadelphia metropolitan area **35 Cents**

In area schools, many long for a breath of fresh air

Children are getting sick, parents say. Administrators share the frustration. For several irritants, federal standards do not exist.

By Jere Downs

INQUIRER STAFF WRITER

When the school nurse called Debi Seibert all to alert her that her son was turning sick, Seibert became suspicious. At baseball games or at home, Kevin, 12, was fine. But after an hour in class at Shamona Creek Elementary School, his chest tightened. "I am freaked," Seibert told officials at a

Downingtown school board meeting Wednesday night. "I can't afford private school."

School officials, too, are frustrated. Although no one is sure what is causing Kevin Seibert's difficulties, Downingtown educators realize that the boy's school — like many others in the United States — is beset by a host of air-quality problems.

After a consultant pointed out excessive

carbon-dioxide levels at Shamona, more fresh air was pumped in. But the source of a pungent, irritating odor in a kindergarten classroom remains unknown. And parents and school officials are still arguing over whether mold caused by a leaky roof is also unhealthy.

The government is little help: There are no government regulations that set acceptable levels of mold, carbon dioxide and bacteria in the air, leaving only an increasingly emotional debate between worried parents and school officials.

"If the government would only set stand-

ards, then I could meet those and satisfy these parents," said Kevin Campbell, facilities engineer for the school district in Downingtown. "We're doing the very best we can."

Increasingly, variations on the Shamona Creek controversy are being played out in school districts nationwide. Air quality is the coming environmental issue for many school districts, just as asbestos was years ago. Today, parents and teachers are complaining that the very air within school walls may pose health hazards to children.

Nationwide, one in five schools has experienced trouble with air quality due to inade-

quate ventilation, said Bob Thompson, author of a soon-to-be-published clean-air manual for schools sponsored by the Environmental Protection Agency. In one in four schools, air is dirtier than it should be because of poor maintenance — mostly the failure to replace air filters and to clean air-handling equipment, he said.

"I hate to use the word ignorance," Thompson said. "Some schools are so unaware, and the fixes can be very simple."

But it's also true that lack of money has forced schools to defer maintenance nation-

See **SCHOOL AIR** on A4



Portsmouth/ Ports. elementary school to be recognized today by EPA

By JEANNINE R. DINGMAN
Democrat Staff Writer

PORTSMOUTH — The efforts of a team of individuals to improve the

respiratory problems and lethargy promoted Portsmouth school officials to authorize a study of Little Harbour's air quality last year, according to David Martin, business

late 1960's as an open concept school.

A number of walls have been installed since that time without an upgrade to the air exchange system.

Schools map out clean-air plan

The project will begin with Streiber Elementary and Chicopee High School next month and will include all 15 in the city.

By TED LaBORDE

Staff writer

CHICOPEE — The School Department will launch an air-quality study this week to ensure that schools are clean and safe.

James Stefanik said yesterday the purpose of the study is to "ensure there is quality air in our school buildings, and that involves an inspection of each and every room by everyone."

Nancy Dulchinos, and by Liz Wheeler and Michael Muldoon, who represent cafeteria and maintenance workers respectively.

Simard said initial checklists will be distributed to all staff at Streiber School this week, and completed by the end of the month.

or vocational education and locker rooms.

Stefanik said there is no expense or renovation and ventilating system in this effort to improve quality.

"The goal is to have a clean, safe, and healthy environment for our students."

Air Quality Becomes Scholastic Focal Point

kit, which includes checklists and questionnaires endorsed by the Environmental Protection Agency.



IAQ & Schools

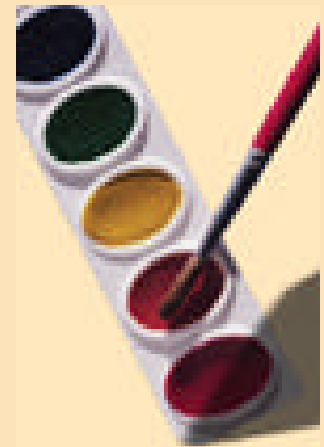
- ◆ Most Schools Have Some IAQ Problems.
- ◆ Your School May Have IAQ Problems.
- ◆ Most IAQ Problems are Easily Remedied.
- ◆ It Pays to be Proactive.
- ◆ Even if there are No Significant Problems,
IAQ Tools for Schools
Can Prevent Problems.





Unique Aspects of Schools

- ◆ **Budgets are Tight**
- ◆ **Space is Densely Populated**
- ◆ **Buildings May be Old and Suffer from Deferred Maintenance**
- ◆ **Special Sources of Pollution and Odors**
- ◆ **Space Utilization**
- ◆ **Additions and Temporary Space**





Effects of Poor IAQ on Children's Health

- ◆ **Indoor air pollution can affect children's learning ability**
- ◆ **Asthma episodes can be triggered by allergens or odors indoors**
- ◆ **Some pollutant harm may be long-lasting or permanent**

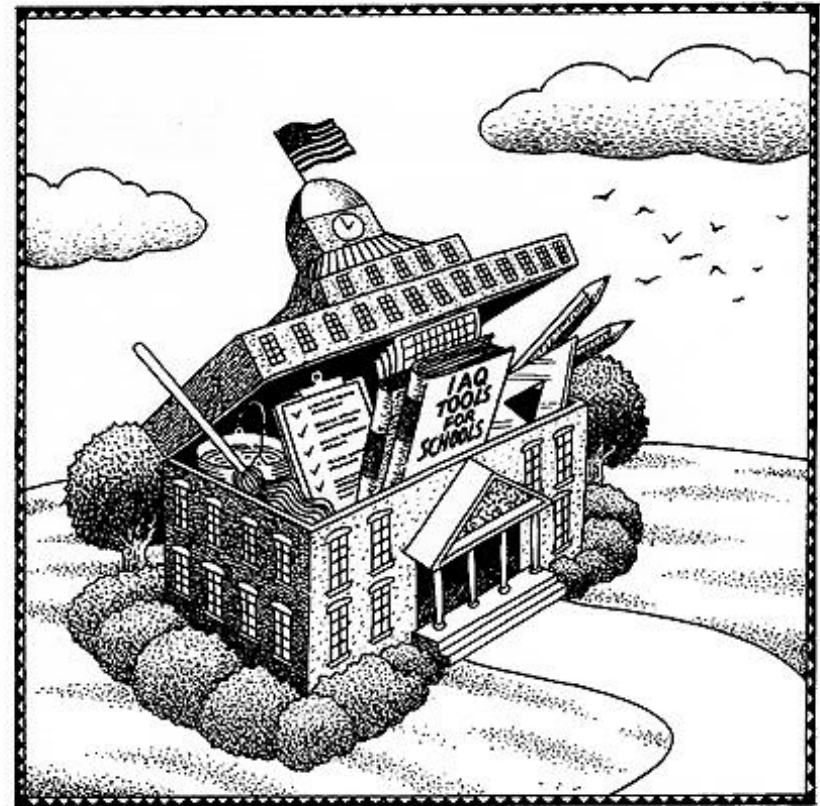


IAQ Tools for Schools

Key Features

- ◆ **Low Cost/ No Cost**
- ◆ **Adaptable to Individual School Needs**
- ◆ **No Specialized Training Required**
- ◆ **Voluntary**
- ◆ **Common Sense Approach**

Indoor Air Quality



Tools For Schools



IAQ Tools for Schools

Kit Co-Sponsors



**U.S. Environmental
Protection Agency**



**Council for American
Private Education**



**American Federation
of Teachers**



**National Education
Association**



**Association of School
Business Officials**



**National Parent
Teacher Association**

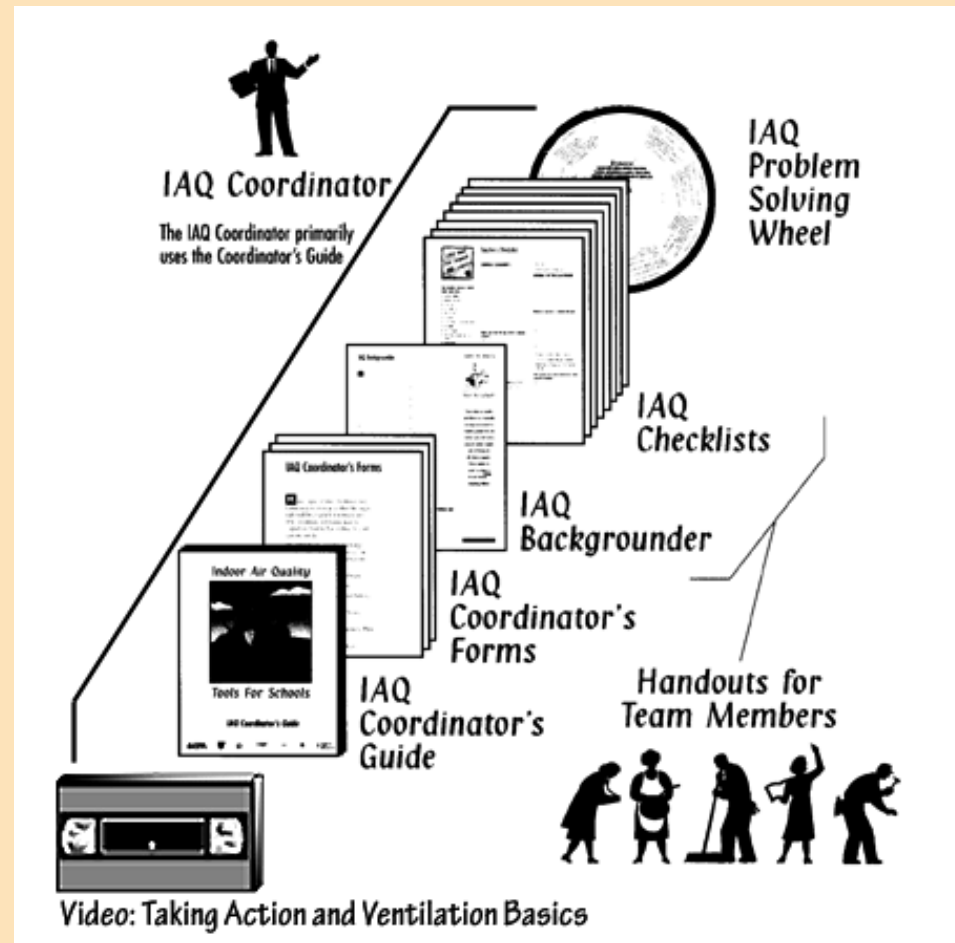


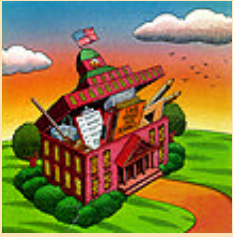
American Lung Association



Purposes of the Kit

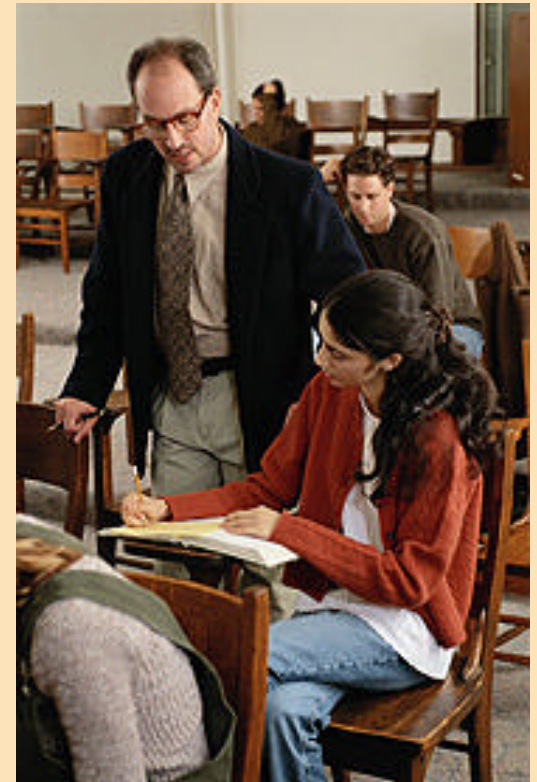
- ◆ **Helps People Easily Diagnose IAQ Problems in Schools**
- ◆ **Simplifies the Process for Maintaining Good IAQ**
- ◆ **Prevents Loss of Dollars and Trust**





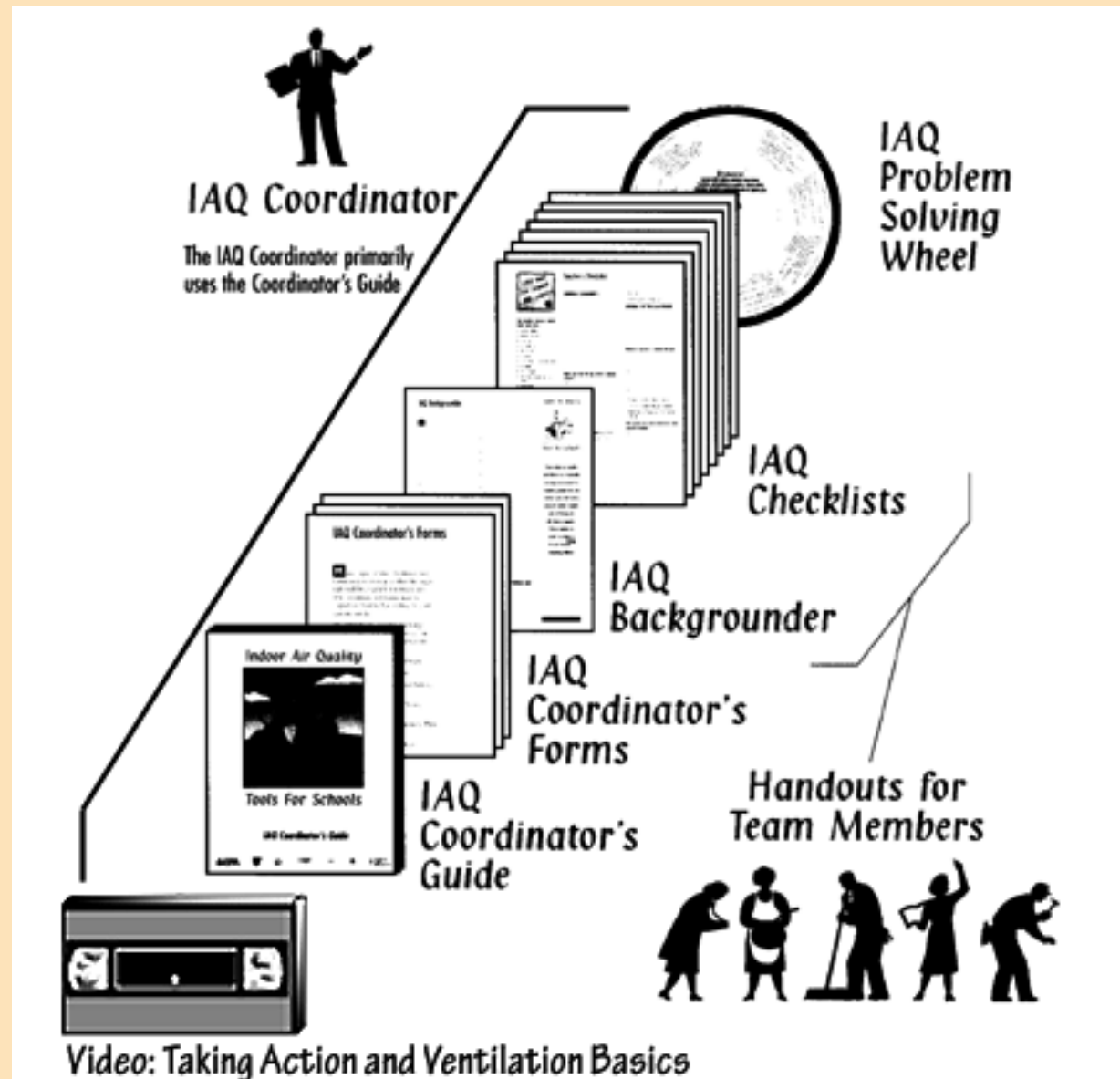
Role of IAQ Coordinator

- ◆ **Disseminates IAQ Information**
- ◆ **Creates and Coordinates IAQ Team**
- ◆ **Implements IAQ Management Plan**
- ◆ **Coordinates IAQ Activities**
- ◆ **Communicates to All Constituents**
- ◆ **Facilitates Resolution of IAQ Problems**





IAQ Tools for Schools Action Kit





IAQ Tools for Schools Action Kit

There are IAQ Checklists for:



Teachers



Building Maintenance



Administrative Staff



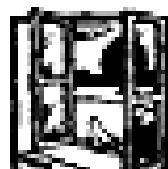
Food Service



Health Officers



Waste Management



Ventilation



Renovation and Repairs



Teacher's Checklist



Teacher's Checklist

GENERAL CLEANLINESS

Regular and thorough classroom cleaning is important to ensure good indoor air quality. Unsanitary conditions attract insects and vermin, leading to possible indoor air quality (IAQ) problems from animal or insect allergens.

This checklist discusses the following major topic areas:

- General Cleanliness
- Animals in the Classroom
- Drain Traps
- Excess Moisture
- Thermal Comfort
- Ventilation
- Local Exhaust Fans and
- Art Supplies
- Science Supplies
- Industrial/Vocational Supplies
- Locker Room

Instructions:

1. Read the IAQ Background.
2. Check off each box as you complete the activity.
3. Check the triangle(s) or circle(s) or check the circle for additional help with the activity.
4. Return this checklist to the Coordinator and keep for future reference.

THERMAL COMFORT

Temperature and relative humidity can affect comfort and IAQ. Changing thermostat settings or opening windows to try to control temporary fluctuations in temperature can worsen comfort problems and also have an adverse effect on other parts of the school.

Check comfort factors

- ☐ Temperature (generally 72°F-76°F)
- ☐ Draftiness
- ☐ Direct sunlight shining on students
- ☐ Humidity is too high (typically if higher than 60% relative humidity, RH) or too low (typically if lower than 30% relative humidity)

☐ Room typically comfortable

☐ Need help, room frequently uncomfortable

Request that custodial staff immediately (carpets need to be cleaned properly, and dried within 24 hours)

- ☐ Request that unit ventilator be cleaned and filter replaced if spilled liquid goes into the unit
- ☐ Report previous spills on carpets or in unit ventilators because they can affect current indoor air quality

☐ No spills

☐ Need help with cleaning spill

ANIMALS IN THE CLASSROOM

Certain individuals, in particular those with asthma, are sensitive to animal fur, dander, body fluids, and feces and may experience reactions to these allergens. Furthermore, individuals can become sensitized (made allergic) by repeated exposure to animal allergens.

Minimize exposure to animal allergens

- ☐ Keep animals in cages as much as possible; do not let them roam
- ☐ Clean cages regularly
- ☐ Locate animals away from ventilation system vents to avoid circulating allergens throughout the room or building
- ☐ Use alternatives to animals if possible

☐ No warm-blooded animals in classroom

☐ Exposure to animal allergens minimized

☐ Need help minimizing exposure to animal allergens

Take special care with asthmatic or other sensitive students

- ☐ Consult the school health officer or nurse about student allergies or sensitivities (privacy laws may limit the information that health officials can disclose)
- ☐ Ask parents about potential allergies in a note that students take home, or during parent teacher conferences
- ☐ Remember to check for allergies when new students enter the class
- ☐ Locate sensitive students away from animals and habitats

Name _____
Room or Area _____
School _____
Date Completed _____
Signature _____



Steps for Starting an IAQ Program

- ◆ Obtain the Kit
- ◆ Appoint an IAQ Coordinator
- ◆ Identify Other Key Team Members
- ◆ Establish an Implementation Schedule
- ◆ Establish a Communication Plan





Remember:

*IAQ is important.
IAQ is an important issue for schools.
You can do something to improve IAQ.
Action is needed now.*